Business Case Analysis

Projected Cash Flow Impact of the Versatile Injury Prevention and Embedded Reconditioning Program at 559th Medical Group, Lackland Air Force Base

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A Business Case Analysis to Project the Cash Flow Impact and Net Present Value of the Versatile Injury Prevention and Embedded Reconditioning Program on the Air Force Basic Military Training Program.

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Disclaimer

Any recommendations or views presented in this business case analysis are solely those of the authors and do not necessarily represent those of Army-Baylor University, the U.S. Army Medical Department (AMEDD), the U.S. Department of Defense (DoD), or the U.S. Government. This business case analysis was conducted in an academic environment with limited access to external data resources. The authors accept no liability for the content of this business case analysis or for the consequences of any actions taken based on the information provided. All DoD personnel should exercise due diligence in verifying the information provided in this business case analysis.

This analysis is based on several assumptions by the authors as to the proper research techniques to answer the research question. These assumptions were developed from teachings at Army-Baylor University, M2 data, and the administrative healthcare experience of the authors. This business case analysis should only be used in the academic field and is not intended as a recommendation for U.S. Government policy or process change.

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Executive Summary:

The Air Force Basic Military Training (BMT) program is physically demanding and can cause musculoskeletal injury to Trainees. The BMT program has an annual population of approximately 30,000 trainees. Of that population, there is an average of 3,800 admitted to Med Hold per year. Current accounting of the musculoskeletal injury (MSK) rate for BMT enrollees is around 66% of that 3,800 (approximately 2,500 MSK-afflicted trainees, annually), according to estimates provided by Captain Nathaniel Nye. MSK injuries make up 40% of all medical attrition from the BMT program. Each of the MSK-afflicted personnel spends an average of 32 days in the Medical Holding flight (MedHold) at a cost to the Department of Defense of $156.86 per day for a total $1.053 Million per month or $12.6 Million per year. In order to mitigate this expense and improve the efficiency of the BMT program throughput to the Air Force, the 59th Medical Group has begun to plan for a sports medicine program. This business case contains analysis of the Basic Military Training program, the current physical therapy program in use by the 59th Medical Group, and the projected model and benefits from a new Versatile Injury Prevention & Embedded Reconditioning (VIPER) program.

A. Introduction

A.1 Background

The United States Air Force Basic Military Training program has an annual enrollment of approximately 30,000 to 40,000 (Manacapilli, Finding the balance between schoolhouse and on-the-job training, 2007) (Nye, Talking paper on VIPER programmatic framework, roles, requirements and timelines, 2014). The medical care for these trainees is primarily performed by the 59th Medical Group, from the Wilford Hall Ambulatory Surgical Center (WHASC) on the Lackland Air Force Base in San Antonio, Texas. The WHASC also takes care of a local active duty military, retired military and military dependent population. The operational medical departments offered by WHASC include, physical therapy, orthopedics, and dental, as well as most other outpatient services. With a budget of $270 million, WHASC's resources are limited and the need for streamlined processes is great (Manacapilli, Reducing attrition in selected Air Force training pipelines, 2012).

WHASC's Outpatient Physical Therapy Clinic utilizes individualized programs, based on an initial evaluation, in order to promote the patient's ability to move, reduce the patient's pain, restore function, prevent disability, and/or achieve other, specific goals. There is also an attached Basic Military Training Physical Therapy Clinic, in order to cater to the specific needs of the BMT program population. With 8 on-staff Physical Therapists and 12 on-staff Physical Therapy Technicians, the Physical Therapy Clinic's monthly appointment capacity is around 3000 patient encounters.

The BMT program population, recruited from the civilian community and in many cases unused to the extreme physical effort of military training, experiences a statistically significant number of MSK injuries (Bullock, Jones, Gilchrist, & Marshall, 2010). The cost of these injuries is directly related to the length of time that the patient is injured but undiagnosed or untreated (Jones, Canham-Chervak, Canada, Mitchener, & Moore, 2010). The current patient care model is based upon a primary care gatekeeper concept (Booth-Kewley, et al., 2014). A patient who has MSK pain must first be seen by a primary care physician, for initial intake and diagnosis. From that point, the patient is referred to physical therapy for further intake, specific diagnosis, and eventual treatment. The lapse of time between injury and direct care for that injury, on average, ranges from two to three weeks, according to Captain Nathaniel Nye.

The total cost of the BMT program, on a per-student basis, is around $9,333 (Manacapilli, Reducing attrition in selected Air Force training pipelines, 2012). This amount assumes a standard, 8.5-week completion time for the program. This indicates an approximate per-day, per-trainee cost of $157. For a trainee who has been injured in a manner that causes continued training to be impossible, the only available option is to enter MedHold and remain there until such a time as the injury is overcome or the Air Force deems resumption of training impossible and administratively separates the individual (Hauret, Jones, Canham-Chervak, & Canada, 2010). During this period, which lasts 32 days on average, the patient is not being trained and is in limbo, at $157 per day (Nye, VIPER: Operationalizing musculoskeletal care, 2014). Even for the trainee who will not require MedHold, the two to three week period in which he or she is awaiting proper diagnosis or treatment increases the probability of an eventual, training-jeopardizing injury (Canham-Chervak, et al., 2010).

Both the United States Army and Navy have developed sports medicine programs to combat the MSK injury rates experienced by their respective military recruit populations. The Army's sports medicine program, the Warrior Athletic Training (WAT) program, based near U.S. Army Initial Entry Training at Fort Benning, GA, has shown positive results and an improvement in recruit MSK injury rates. The Navy's Sports Medicine and Rehabilitation Team (SMART) clinic model has also been used to decrease the MSK injury rates at the Recruit Training Command, Naval Station Great Lakes, Chicago, IL. The specific benefits are difficult to quantify, due to a lack of study and uniformity of staffing, but the improvements to the recruit washout rates from MSK injury is somewhere between 14% and 38% (Knapik, et al., 2012).

A.2 Subject of the Case

The subject of this business case analysis is to evaluate the costs and benefits of initiating and implementing an Air Force sports medicine program, called the VIPER program, in order to maximize the benefit to the MSK injured population of the BMT. This analysis compares the cost and benefits of providing both early physical therapy intervention and aggressive physical therapy treatment to injured trainees as compared to the current process, over a five-year period from FY 2015- FY 2020.

A.3 Purpose

The purpose of this business case is to provide financial data and analysis to senior Air Force leadership regarding the cost of creating a program for the early detection and treatment of MSK injuries within the BMT population.
Financial reporting will include:

- Comparison of cost between the current Air Force model and the full VIPER model, to include projected benefit calculations
- Comparison of cost between the current Air Force model and optimizing the current physical therapy program, to include projected benefit calculations
- Cost comparison of the proposed, current, and other models
- Data, information, and analysis pertaining to the efficient use of current resources
- Percentage of total MedHold spending compared to future total MedHold spending

This data will assist Air Force leadership in ascertaining the economic value of the VIPER program and allow decision makers to assess the benefits of continuing the current business model or transitioning to a new model.

A.4 Situation and Motivation

Between 2012 and 2014, medical washouts from the BMT program increased from 1.3% of the total population to 3.3% (Nye, VIPER: Operationalizing musculoskeletal care, 2014). The attendant costs to the Air Force, both from medical treatment and sunk recruiting costs, not to mention the replacement of those personnel, require examination. If there is a method to efficiently treat MSK injured BMT personnel more efficiently, it is important to discover it. The proposed course of action explored in this case offers alternatives to the status quo, and suggest possible benefits for the future.

A.5 Business Objectives

The objectives of this business case analysis are:

- To clarify MSK injury treatment options
- Assess the current capacity of the physical therapy program
- Enable the Air Force to assess budgetary implications of options

B. Methods and Assumptions

B.1 Scenarios and Data

The scenario or location chosen for this business case analysis is Lackland Air Force Base, in San Antonio, Texas. This includes the Wilford Hall Ambulatory Surgical Center and the Medical Holding flight of the Air Force Basic Training Command. This location was chosen due to the high number of BMT MSK injuries and the attendant cost of their medical treatment. Recommendations regarding a plan, or course of action to pursue, ought to indicate a trend for the rest of the U.S. Air Force. The data in this business case was retrieved from M2, our Air Force points of contact and specific literature review, directed by the analysis question. Data pulled covers FY 2013 through FY 2014. Other military services have previously done similar business case analyses, and those data were used, as comparison data.

The current planning team for the BMT physical therapy and VIPER program have already made some investment in equipment. The current equipment spending of $243,100 has been spent on physical training and diagnostic equipment that can be used in any of the suggested Courses of Action.

In the M2 Data Mart, the calculation for per encounter costs included direct care costs, variable costs, pharmacy costs, and all other step down costs as performed by the Expense Assignment System (EAS). Data for assessing effectiveness if the VIPER program was limited to that associated with the BMT UICs.

One of the difficult points of this analysis is the fact that all money spent by the Air Force must be viewed as out-going, cost-money. This has the effect of giving courses of action that describe the least money lost, rather than the most money made or saved. The profit to loss on any of the opportunities discussed lean entirely toward the loss. Another important factor is the greatest benefit is to the Air Force's Operations and Maintenance (O&M) budget, while the greatest expense comes from the Air Force's Defense Health Program (DHP) budget. These separate funding lines cannot be shared, so the distinction is significant.

The workload data analyzed for this BCA was obtained from M2 Data Mart queries. This includes enrollee count, direct care, as well as purchased care data. The data is provided in Appendix A.

Course of Action 1

Course of Action 1 is a financial description of the status quo. With no changes to current practice, what can the BMT and WHASC expect to see over the five-year period? The total cost of the BMT program, on a per-student basis, is around $9,333 (Manacapilli, Reducing attrition in selected Air Force training pipelines, 2012). This amount assumes a standard, 8.5-week completion time for the program. This indicates an approximate per-day, per-trainee cost of $157. For a trainee who has been injured in a manner that causes continued training to be impossible, the only available option is to enter MedHold and remain there until such a time as the injury is overcome or the Air Force deems resumption of training impossible and administratively separates the individual (Hauret, Jones, Canham-Chervak, & Canada, 2010). During this period,

which lasts 32 days on average, the patient is not being trained and is in limbo, at $157 per day. This equates to approximately ($-12.6 million) per year.

Concurrently, the Physical therapy program operates at a loss of nearly $11 per visit. At over 8,000 visits per year, this equates to greater than ($90K) per year.

The net present value of this cost, for the 5-year period, is around $-64.5 million.

Course of Action 2

Course of Action 2 is the optimization of the currently existing physical therapy clinic program. The current physical therapy program employs eight (8) physical therapists and 12 physical therapy technicians. Based upon current data from across the physical therapy industry, this number of full-time employees ought to be able to maintain 3,120 encounters each month (Edgar, 2011). During FY2014, the average monthly encounters for the physical therapy clinic were about 688 for BMT and 2382 in total. This optimization, and the addition of an aggressive targeting model for the BMT MedHold population, ought to increase the effectiveness of the physical therapy program by 38%. The attendant reduction in MedHold days for each BMT MSK injury should have attendant financial benefits to the Air Force.

By optimizing the physical therapy encounters, maximizing the patient load for both the physical therapist and the physical therapy technicians, the $-12.6 million loss of O&M funds could be reduced by around $-4.8 million, annually. The increase in encounters to the physical therapy department will also result in increased operational losses to the DHP budget by approximately $400K. The net present value of this change in cost, for the 5-year period, would be around $-26.9 million.

Course of Action 3

Course of Action 3 is the institution of the Versatile Injury Prevention & Embedded Reconditioning program. The VIPER program requires the hiring of four (4) full time athletic trainers; two (2) to be embedded within MedHold and two (2) within the physical therapy clinic. There are also some equipment costs to the VIPER. The cost of the contracts for the four athletic trainers, estimated at $84,000 per employee per year, cuts into the overall loss reduction. The assumed increase in the effectiveness of the physical therapy program by 38% is augmented in the VIPER model by a 22% prevention of BMTs into MedHold.

The institution of the VIPER clinic, with its 38% increase in physical therapy effectiveness and 22% preventive benefit, as well as the costs, should decrease the Air Force loss of $-12.6 million by about $-6.5 million per year. The net present value of this change in cost, for the 5-year period, would be around $-35.5 million. Again, the net present value that is closer to $0, the least cost, is better.

B.2 Scope of the Case

Time

The business case analysis covers a period of five fiscal years, beginning on 1 October 2015 and ending on 31 September 2020.

Geographic Area and Organizations

The scope of this business case analysis encompasses the entire Air Force BMT program, as well as the outpatient physical therapy clinic at WHASC. Certainly, the findings of this business case analysis are applicable only to this narrow geographic area, and have only possible benefits or relation to the rest of the military health system.

Data Collection

All data collected regarding MHS beneficiary costs and care, are collected from M2.

B.3 Global Assumptions

Due to the time sensitive constraints of this business case analysis, several assumptions were made. This business case analysis specifically assumes:

- Course of Action 2 – "Aggressive" physical therapy numbers equate to a 38% reduction in recovery days.
- Course of Action 3 – MedHold prevention rate of 22% as well as a 38% reduction in recovery days.
- A general assumption of the accuracy of the RAND study's BMT cost per day estimates.

B.4 Financial Benefits

The financial benefits of any of the Courses of Action rely on the understanding that the savings in each is only an assumed savings. What is actually occurring is a lessening of loss. Course of Action 1 does not lessen the loss at all. Under Course of Action 1, the current losses taken by the Basic Military Training program continue.

The financial benefits to Course of Action 3, the VIPER program, are more substantial, though still costly and will require time to bring into effect. In spite of a more robust revenue ratio, the overall Net Present Value of Course of Action 3 is not substantial in the face of the costs.

In contrast to the above, the financial benefits of Course of Action 2, the optimized physical therapy program, have immediate benefits, without the attendant time delays. By leveraging existing assets and maximizing their possible outcome, Course of Action 2 has both the best Net Present Value and the least loss over the time period, as shown in Appendix B.

B.5. Projections

Our projections are based upon the assumption of a standard military pay inflation rate of 1.58% (Office of the Under Secretary of Defense, 2013). We have also assumed a contract pay inflation rate of 2.89% (Office of the Under Secretary of Defense, 2013). The projected values, as well as the standard discount rate used in federal government business case analyses of 0.4% (Office of Management and Budget, 2015).

B.6 Analysis

Comparing the Courses of Action 1-3, it becomes clear that the lowest Net Present Value is available with Course of Action 2. This indicates that, although there may be a benefit to a long-term sports medicine program within the Air Force, it is not clearly beneficial until the current assets available are utilized properly. Though it is unlikely that the WHASC physical therapy clinic is being utilized at the low levels that it appears to be, there is an apparent disconnect between what is currently possible and what is currently, empirically, occurring. As long as there is an apparent underutilization of a current program, it cannot be a good plan to add a new program, that may itself be underutilized.

B.7 Soft Benefits

Soft Benefits are the non-quantifiable benefits of a given Course of Action. In the case of the above listed, there are possible soft benefits ranging from improved physical

fitness programs to improved enlisted Air Force personnel moving into their professional training. These benefits are long-ranging and have great possible benefit, but must be balanced against quantifiable costs. It is possible that the VIPER program could revolutionize all of physical training, in the Air Force, as well as in other branches of service. That possibility is theoretical and therefore must be balanced against the costs of the program and the known benefits of other Courses of Action.

C. Conclusions and Recommendations

Though the Wilford Hall Ambulatory Surgical Center's physical therapy clinic does sterling work, it appears that they do not do enough of it. According to the projections of the Air Force and of the WHASC's own business plan, there are shortages in the provided therapy from their clinic. These shortfalls are assisting the increase of annual cost of the Basic Military Training Medical Hold flight. Though it is true that other military services have had success with sports medicine clinic models, all of the models have assumed that the physical therapy program extant at the time of implementation, was working at full capacity. In this case, that is not an assumption that can be made.

The recommendation of this Business Case Analysis is to implement Course of Action 2, optimization of the current physical therapy program, with an emphasis on the BMT MedHold injuries. By focusing the current program and maximizing its efforts, there is a far greater return on investment than with any other Course of Action.

Furthermore, a thorough analysis of all data systems, including, but not limited to, personnel alignment, expense assignment, cost accounting, and clinical data is indicated. This includes the Defense Civilian Personnel Data System (DCPDS), the Defense Human Resources System, internet (DHMRSi), AHLTA, and the Expense Assignment System IV (EASIV). Focus should be on Medical Expense Performance Reporting System (MEPRS) alignment, DMHRSi accountability and accuracy, US AIR FORCE Defense Enterprise Accounting and Management System (DEAMS) alignment, and clinical coding timeliness and accuracy.

Appendix A

Current FY14 PT Program Workload Data	
Current PPS Revenue per PT RVU	$34.04
Annual RVUs Generated	23,854.54
Encounters	8,261.00
Total Cost	$903,654.49
Cost Per Encounter	$109.39
PPS Revenue	$812,008.54
Current ROI	($91,645.95)
VIPER Effectiveness Reduction Percentage for BMT	38%

Appendix B

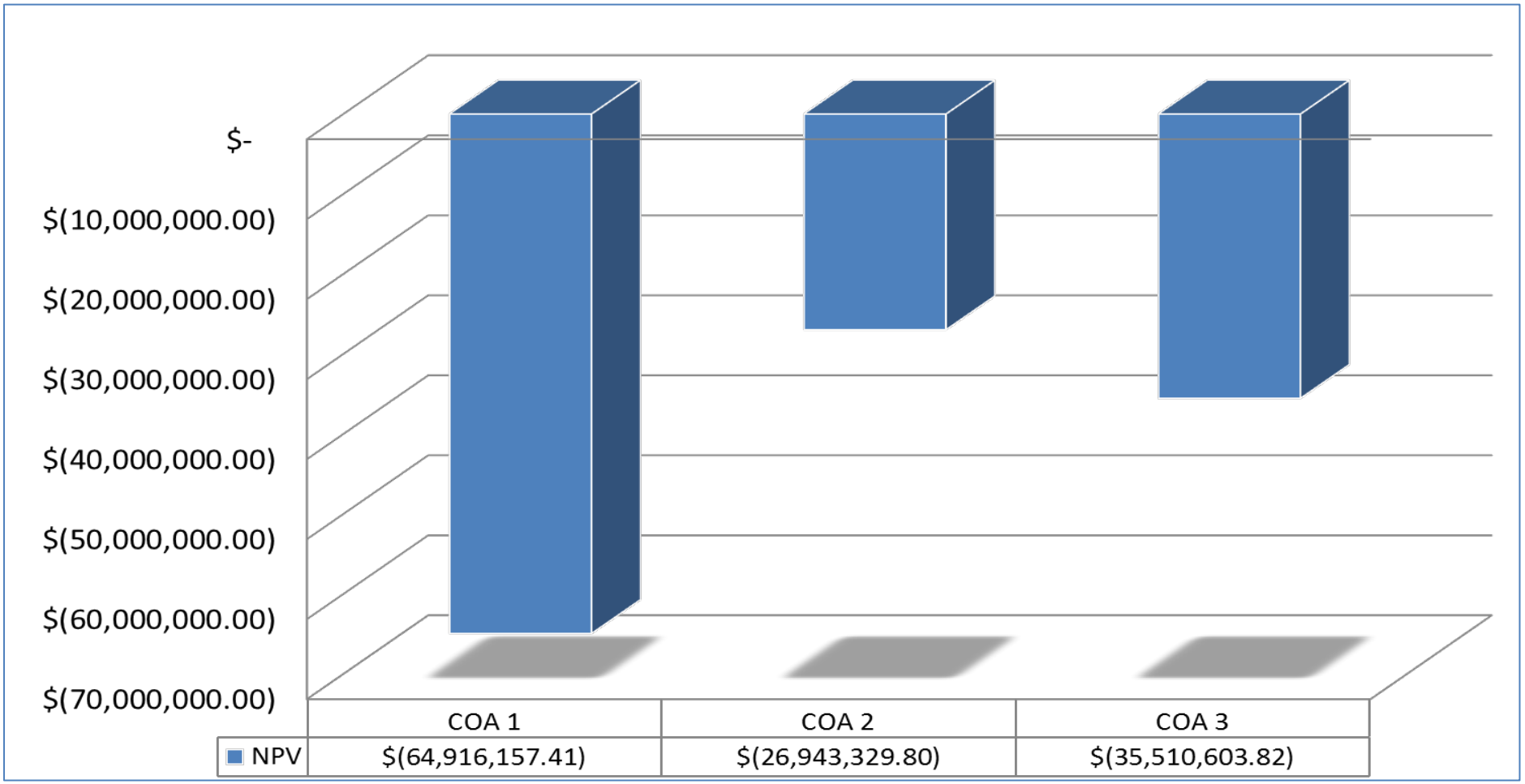

Figure 2: Graph showing Courses of Action as Net Present Value

Appendix C

References

Booth-Kewley, S., Schmied, E. A., Highfill-McRoy, R. M., Sander, T. C., Blivin, S. J., & Garland, C. F. (2014). A prospective study of the factors affecting recovery from musculoskeletal injuries. *Journal of Occupational Rehabilitation*, 287-296.

Bullock, S. H., Jones, B. H., Gilchrist, J., & Marshall, S. W. (2010). Prevention of physical training related injuries. *American Journal of Preventive Medicine*, S156-S181.

Canham-Chervak, M., Hooper, T. I., Brennan, F. H., Craig, S. C., Girasek, D. C., Schaefer, R. A., . . . Jones, B. H. (2010). A systematic process to prioritize prevention activities. *American Journal of Preventive Medicine*, S11-S18.

Edgar, C. B. (2011). Benchmarking physical therapy programs. *AAOS Now*, 34-38.

Fritz, J., Childs, J., Wainner, R., & Flynn, T. (2012). Primary care referral of patients with low back pain to physical therapy. *SPINE Journal*, 2114-2121.

Gatchel, R., Polatin, P., Noe, C., Gardea, M., Pulliam, C., & Thompson, J. (2003). Treatment and cost-effectiveness of early intervention for acute low-back pain patients: A one year prostpective study. *Journal of Occupational Rehabilitation*, 1-10.

Hauret, K. G., Jones, B. H., Canham-Chervak, M., & Canada, S. (2010). Musculoskeletal injuries: Description of an under-recognized injury problem among military personnel. *American Journal of Preventive Medicine*, S61-S70.

Jennings, B. M., Yoder, L. H., Heiner, S. L., Loan, L. A., & Bingham, M. O. (2008). Soldiers with musculoskeletal injuries. *Journal of Nursing Scholarship*, 268-274.

Jones, B. H., Canham-Chervak, M., Canada, S., Mitchener, T. A., & Moore, S. (2010). Medical surveillance of injuries in the U.S. military. *American Journal of Preventive Medicine*, S42-S60.

Knapik, J. J., Graham, B., Cobbs, J., Thompson, D., Steelman, R., Grier, T., . . . Jones, B. H. (2012). *The soldier athlete initiative: Program evaluation of the effectiveness of athletic trainers compared to musculoskeletal action teams in initial entry training.* Aberdeen Proving Grounds: U.S. Army Public Health Command .

Manacapilli, T. (2007). *Finding the balance between schoolhouse and on-the-job training.* Santa Monica: RAND Corporation.

Manacapilli, T. (2012). *Reducing attrition in selected Air Force training pipelines.* Santa Monica: RAND Corporation.

Masters, D. (2003). *Sports medicine and rehabilitation team clinic: Comparative model analysis of Navy and Marine Corps options.* Falls Church: TRICARE Management Activity.

Nelson, A. D., & Kurina, L. M. (2013). Clinical prediction of musculoskeletal related "Medically not ready" for combat duty statuses among active duty U.S. Army soldiers. *Military Medicine*, 1365-1372.

Office of Management and Budget. (2015). *2015 discount rates for OMB Circular No. A-94 (OMB Memorandum No. M-15-05).* Washington, DC: U.S. Government Printing Office.

Office of the Under Secretary of Defense. (2013). *National defense budget estimates for FY 2014.* Washington D.C.: Department of Defense.

Roy, T. C., Songer, T., Ye, F., LaPorte, R., Grier, T., Anderson, M., & Chervak, M. (2014). Physical training risk factors for musculoskeletal injury in female soldiers. *Military Medicine*, 1432-1438.

Ruscio, B. A., Jones, B. H., Bullock, S. H., Burnham, B. R., Canham-Chervak, M., Rennix, C. P., . . . Smith, J. W. (2010). A process to identify military injury prevention priorities based on injury type and limited duty days. *American Journal of Preventive Medicine*, S19-S33.

Teyhen, D. S., Riebel, M. A., McArthur, D. R., Savini, M., Jones, M. J., Goffar, S. L., . . . Plisky, P. J. (2014). Normative data and the influence of age and gender on power, balance, flexibility and functional movement in health service members. *Military Medicine*, 413-420.

Teyhen, D. S., Shaffer, S. W., Umlauf, J. A., Akerman, R. J., Butler, R. J., Goffar, S. L., . . . Plisky, P. J. (2012). Automation to improve efficiency of field expedient injury prediction screening. *The Journal of Strength and Conditioning Research*, S61-S72.